Chapter 5

Unavoidable Significant Impacts and Irreversible Environmental Changes

5.1 Introduction

This chapter discusses unavoidable significant impacts and irreversible environmental changes of the proposed project (EDCP and Two-Year Komeen Research Trials). Under CEQA, an unavoidable significant impact is described as an impact which reaches the significance threshold, but for which no feasible mitigation is available to reduce the impact to a less than significant level. An irreversible environmental change is described as a permanent change or impact to the environment, such as permanent removal of habitat or current and future commitments to using non-renewable resources. In some cases, an unavoidable significant impact could constitute an irreversible environmental change.

The proposed project would result in unavoidable significant impacts to water quality, intertidal wetland plants, aquatic invertebrates, fish, reptiles, amphibians and birds. These impacts, which are described below, were discussed previously in chapters 3 and 4, along with proposed mitigation measures. Only one of these impacts, the effect of Komeen on Delta sediments (discussed under Water Quality below), could potentially result in an irreversible environmental change. However, as discussed below, the exact nature of this impact is not clear. There are no other irreversible environmental changes associated with the proposed project.

Several potential impacts resulting from the Komeen Research Trials are included in this section despite uncertainty as to their likelihood of occurrence. Specifically, uncertainties exist as to the direct impact that Komeen and Komeen residues may have on various fish species, Komeen's potential for bioaccumulation, and the ultimate fate of copper added to the aquatic environment (water column and sediments) as Komeen. These potential impacts are described here, as in Chapter 4, as "unavoidable potentially significant impacts."

5.2 Water Quality

5.2.1 General Water Quality

Use of herbicides in the Delta would conflict with certain water quality standards set forth in the Water Quality Control Plan for the Central Valley Region (Basin Plan). Since these standards are established to protect water quality in the Bay/Delta region, their exceedence implies a decrease in water quality. These conflicts cannot be mitigated and are thus considered unavoidable significant adverse impacts. They include the following:

- The DBW proposes to apply Komeen to treatment areas at concentrations between 0.50 to 0.75 ppm copper, for the Two-Year Komeen Research Trials. Application of Komeen at these concentrations would result in a temporary exceedence of the Central Valley Region's water quality standard for copper, which specifies a 0.01 ppm maximum concentration limit for dissolved copper in Central Valley inland surface waters. Proposed Komeen concentrations are 50 to 75 times higher than this water quality standard.

  Studies suggest that increases in water column concentrations of copper following Komeen application would be temporary, dissipating within several days of application (Anderson 1998, Trumbo 1997, Trumbo 1998). Thus, exceedence of the Basin Plan Standards would be temporary. Despite this, the exceedence would be an unavoidable significant impact.

- Though copper can dissipate from the water column, it does not degrade and will accumulate in the sediments over time (Leslie 1992). The Two-Year Komeen Research Trials would likely increase the sediment copper load near or downstream of treatment sites to some undetermined extent.

  The result of this increase in sediment copper is unknown and depends in part on whether the chelated copper compound used in Komeen could become ionized. If ionization occurred, copper could be released to the environment in a form that adversely affects general water quality and is toxic to aquatic organisms. For this reason, Komeen application could be viewed as conflicting with Basin Plan standards regarding the use of pesticides, since it could adversely impact beneficial uses.

  Additional information is needed to determine the fate and effect of Komeen and Komeen residues in sediments. Until more scientific information is available, the affect of Komeen on general water quality would be considered an unavoidable potentially significant impact, due to the potential impact of Komeen on Delta sediments.

Further, this impact may constitute an irreversible environmental change, since the Komeen Trials could result in a relatively small, but permanent addition of copper to the sediments.

- Application of Reward, Sonar, or Komeen appears to conflict with water quality standards for disallowing toxic substances in water sources, as described in the Basin Plan. When applied at label rates, all of these herbicides would be toxic to *Egeria* and other introduced and native aquatic plants. Further, Reward and Komeen have moderate toxicity to fish and aquatic organisms, and could adversely impact reptiles, amphibians and birds. This degradation of water quality would be an unavoidable significant impact.
- Mechanical harvesting could result in short-term localized increases in turbidity due to harvester maneuvering. This could be viewed as a violation of the Basin Plan standard regulating turbidity. Turbidity is expected to decrease immediately once harvesting operations are completed. Though temporary, this would be an unavoidable significant impact.

5.3 Biological Resources

5.3.1 Intertidal Wetland Plant Communities

Intertidal wetland plant communities that occur along Delta channels and on in-channel islands potentially would be impacted by EDCP herbicide treatments and Komeen Research Trials. These intertidal wetland plant communities would be adversely impacted by wave wash or flooding during high tide if herbicide concentrations in the channel water were at treatment levels. Special status plant species in these areas, such as Mason's lilaeopsis, rose mallow and delta mudwort, as well as other wetland plants, could be lost due to exposure to these herbicides. This could in turn lead to an increase in erosion and a corresponding decrease in water quality. Loss of intertidal wetland vegetation also could impact reptiles, amphibians or birds that use these environments as habitat. This potential loss of sensitive intertidal wetland plants is considered to be an unavoidable significant impact.

5.3.2 Invertebrates

Use of Reward, Komeen and mechanical harvesting could cause a temporary decrease in the abundance of invertebrates in and around treatment sites. The decrease in invertebrates would likely be temporary. It is expected that planktonic invertebrates would be reintroduced to treatment areas inadvertently through water flow. Further, benthic and plant-dwelling organisms would likely recolonize treatment areas relatively rapidly once regrowth of plants began. This would be an unavoidable significant impact.

5.3.3 Fish

Findings from two studies (McGowan 1998, McGowan and Marchi 1998, Grimaldo and Hymanson 1999) suggest *Egeria* is not typically used by native fish species or specifically any threatened, endangered or special status species as habitat or as a migration corridor. However, special status fish species, such as delta smelt and splittail, occur in the Delta year round while others, such as chinook salmon and steelhead, migrate through at various times of year. Thus, the potential exists for impacts to occur to these fish due to the EDCP and Two-Year Komeen Research Trials, despite mitigation measures. Such impacts could involve harassing, harming, wounding or killing individual fish that may be present in the project area. Likewise, during EDCP treatments adverse impacts could occur to non-listed native and

introduced, resident and migratory fish present in the Delta. Unavoidable significant impacts to fish species resulting from particular project components include the following:

- Mechanical harvesting could result in removal of fish that forage, spawn, rear, or migrate through beds of *Egeria*.. During mechanical harvesting, fish could be injured or killed by harvester cutting bars, or more likely, could become entangled in harvested plant material and removed from the water column. Loss of fish due to mechanical harvesting would be an unavoidable significant impact.
- The target concentration for Komeen proposed for use under the Research Trials is lower than that expected to result in mortality to most fish species, including delta smelt (Huang and Guy 1998). However, there is evidence that, at target concentrations, Komeen could adversely impact some fish species. The possibility exists that Komeen concentrations could be lethal to some fish species, especially during the first nine hours following application. Although no tests have examined the toxicity of Komeen to chinook salmon or steelhead, LC50 data for rainbow trout suggest that salmonids would not be affected by use of Komeen at the concentrations proposed for the research trials. No tests have been conducted to determine the effect of Komeen on splittail, green sturgeon, pacific lamprey or river lamprey. Loss of fish due to the Komeen research trials would be an unavoidable significant impact.
- Copper is not biodegradable and will persist in the environment indefinitely. One of the unavoidable significant adverse impacts resulting from the Komeen trials is the addition of copper into the ecosystem. In terms of impacts to biological resources, there is the potential that the bioavailability of this copper compound could be altered over time (due to physical, chemical, or biological processes), resulting in a more toxic form of copper. In its free or ionic form, copper is much more toxic to aquatic organisms than is the chelated form found in Komeen, and can result in both lethal and sublethal effects (Eisler 1997). Therefore, the use of Komeen could result in unavoidable potentially significant impacts to sensitive fish species over the long-term.
- With use of Komeen, there is the potential for bioaccumulation of copper in fish and other aquatic organisms. This could have a variety of adverse impacts on aquatic organisms as well as piscivorous terrestrial organisms, depending on whether the copper was still in its chelated form, or had speciated to a more toxic form.

- Application of Komeen and Reward, as well as mechanical harvesting could cause a temporary decrease in the abundance of aquatic invertebrates. This could adversely impact special status fish that consume these invertebrates. This would be an unavoidable significant impact.

5.3.4 Wildlife—Reptiles and Amphibians

Application of Reward, Sonar, or Komeen could adversely impact reptiles and amphibians that utilize channels and channel banks in the Delta. Special status species that could be impacted include giant garter snake, Western pond turtle and red-legged frog. Loss of reptiles or amphibians due to herbicide application would be a potentially long-term unavoidable significant impact.

5.3.5 Wildlife—Bird

Use of Reward, Sonar, or Komeen could adversely impact birds that nest on channel banks since the herbicide could kill channel bank vegetation. Further, piscivorous birds could be impacted directly by Komeen, since this herbicide can bioaccumulate in fish tissues. Special status birds that could potentially be impacted include California black rail, tricolored blackbird and great blue heron. Loss of birds due to herbicide application would be an unavoidable significant impact.